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DISEASES OF INFANTS AND CHILDREN

JOHN FITCH LANDON, M.D., Editor

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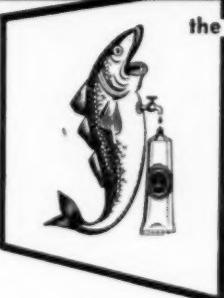
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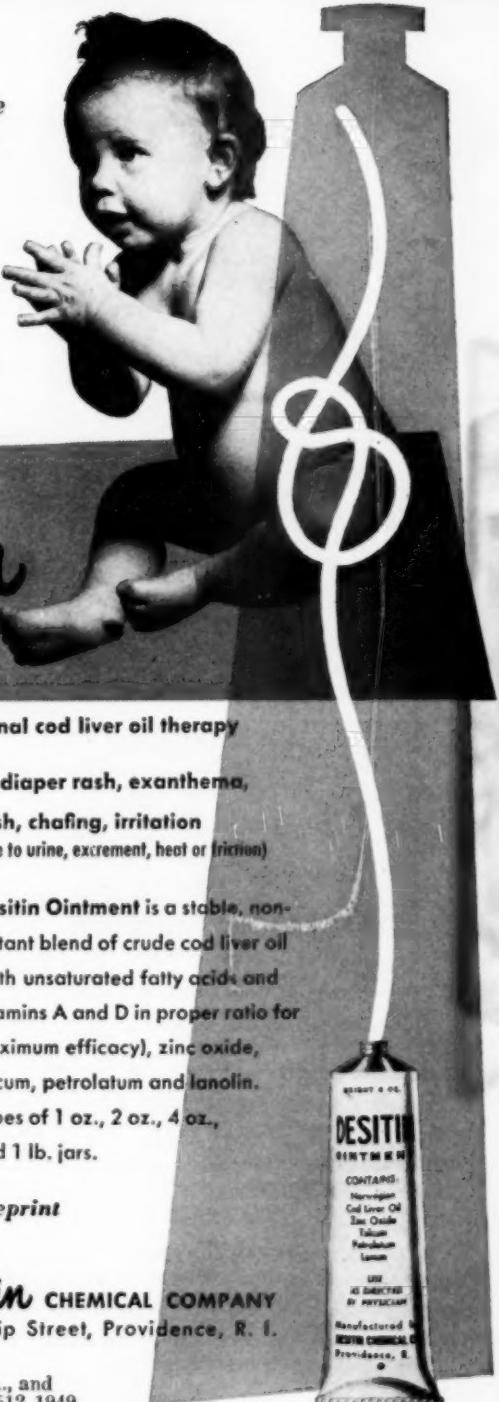
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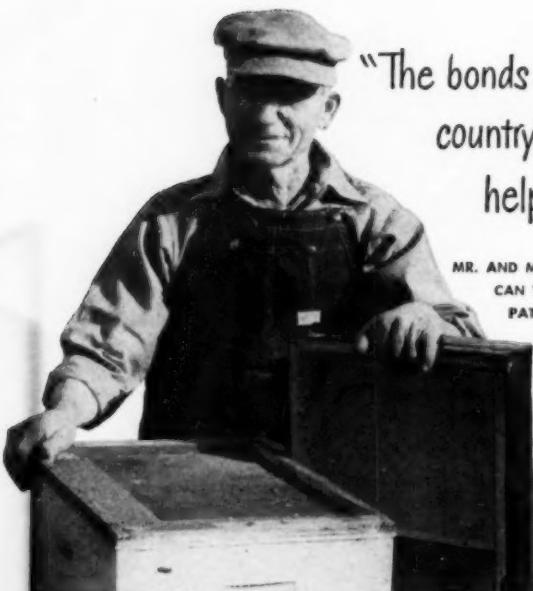
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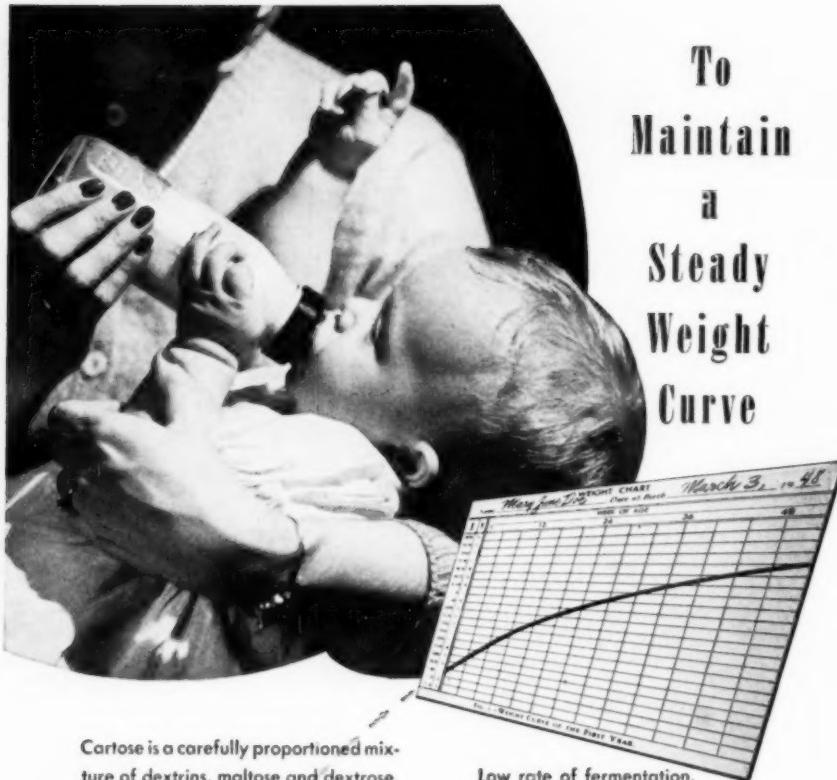
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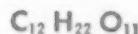
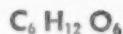
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URINARY INCONTINENCE IN CHILDREN*

NORBORNE B. POWELL, M.D.

Houston, Texas

Enuresis is defined as the incontinence of urine. Diurnal enuresis is day incontinence while nocturnal enuresis is commonly called bedwetting. Anderson¹ found 80 per cent of enuretics of nocturnal type, 11 per cent of combined nocturnal and diurnal type, 3 per cent of diurnal type, and 6 per cent associated with fecal soiling. Most writers agree that the average normal child will have day control of urine by two and a half years of age, and night control by three.

The frequency of nocturnal enuresis ranges from 8 to 26 per cent according to various authors.²⁻⁶ By the age of 10, most enuretics gradually gain urinary control.

Heredity factors are thought to be important by Campbell² and Frary.⁷ The latter believes that heredity is more important than environmental influences. Campbell commented on the frequency of poor parental stock and found at least one parent neurotic or psychoneurotic. Other writers have stressed the hereditary factor also.^{5, 6, 8-10}

Bakwin² makes much of the difference between nocturnal enuresis and "fractious enuresis." The latter is psychogenic in origin and fortunately infrequent. It occurs in "lazy" children, sleeping in a dark, cold room, inaccessible to a toilet, or in households where cleanliness is poorly developed. Children in institutions have a high incidence of enuresis when the staff is harsh and tyrannical.

*From Baylor University, College of Medicine, Department of Urology.

The diagnosis of psychological enuresis doubtless has been overworked. It hinges on several factors: (1) parental strife, (2) emotional instability of one or both parents or grandparents, (3) jealousy of younger siblings, (4) over-protection by a parent, (5) over-emphasis of enuresis by parents, (6) punishment or erratic rewarding for success in enuresis control, (7) attempts at urine and bowel control too early, (8) tension and fear (as produced by the bombing raids of London during World War II), (9) constitutional maladjustment personality.^{1, 11-16} The occurrence of enuresis with somnambulism, nail biting, nightmares, etc. is well known.¹¹ Enuresis may be a symptom of a generalized behavior problem.¹⁶

Most authors agree that children with mild degrees of mental deficiency have no more enuresis than normal children, but mentally deficient children have a high incidence of enuresis. Thorn⁶ reported enuresis in 83.8 per cent of 54 idiots, 12.8 per cent of 164 imbeciles, and 4 per cent of 125 morons.

Some authors^{17, 18} believe that enuresis is functional in from 50-90 per cent of cases, but Campbell² found 60 per cent of 700 enuretics had organic uropathy sufficient to explain enuresis. He stressed the necessity of a complete urological study by a competent urologist before considering a diagnosis of functional enuresis. Most commonly listed organic causes are: (1) posterior urethral valves, (2) strictures of urethra and/or meatus, (3) ectopic ureteral orifice, (4) urethral or bladder diverticulum, (5) vera hypertrophy, (6) bladder neck hypertrophy, (7) nerve lesion (spina bifida), (8) exstrophy of the bladder.

Allergy either directly or indirectly has been thought to cause enuresis.^{19, 20}

TREATMENT

An astounding number of treatments have been advocated through the years for cure or relief of enuresis. Every drug in the pharmacopoeia has been used at one time or another with varying degrees of success. Atropine and its derivatives have stood the test of time in certain types of enuresis and should be given to the resistant enuretic. Many other drugs have been tried, including ephedrine, trasentin, testosterone, gonadotropin, caffeine, mecholy,

etc. Movitt²¹ even suggested epidural injections of sodium chloride and strychnine for certain types of enuresis.

Schauffler²² ridiculed the use of sounds; however, urethral dilations have been used by most doctors for many years. More recently transurethral fulguration of bladder neck and posterior urethral enfolds and polyps has been successful in curing chronic enuretics.^{23, 24} Urethral meatotomy has been advocated by many writers.^{2, 8, 23-26}

Massaging the trigone per rectum,²⁷ water distention of the bladder,^{17, 27} a conditioning reflex alarm system^{17, 27, 28} and relief of labial and coronal adhesions are reported as aiding in treatment of enuresis.²⁵

REPRESENTATIVE CASES

Case 1. B. W., a 3-year-old white female, had enuresis and difficulty in urinating as chief complaints. The bladder, urethra and intravenous pyelograms were negative. She was dilated on several visits up to a No. 22 FS with complete cessation of enuresis. This represents a cure of enuresis by local instrumentation.

Case 2. A. R., a 6-year-old white female, was noticed to strain while urinating, first at the age of eight weeks. Urinalysis at that time showed pus and blood which cleared with sulfonamides. There had been no trouble until recently when enuresis returned. The number of bedwettings per month increased. Intravenous pyelograms showed a normal right kidney and ureter, and early hydronephrosis of the left kidney with calyceal blunting. Complete examination under general anesthesia revealed definite enfolds of tissue at the bladder neck (between five and seven o'clock) and urethral stenosis. The enfolds were resected and the bases lightly fulgurated. A No. 16 Foley catheter was left indwelling for three days. She was sounded at weekly intervals for eight weeks. She has remained cured of enuresis since that time. The left hydronephrosis obviously is coincidental, but is being followed carefully. This is a case cured of enuresis by transurethral bladder neck resection.

Case 3. M. E. B., a 4-year-old white male, was first seen with a history of straining to urinate, urgency, dribbling and enuresis. There had been one episode of fever about two months previously.

A normal urine was found but a No. 10 FS would not pass into the pin-point urethral meatus. A No. 8 FS could be passed into the membranous urethra. In the office, under local anesthesia, a meatotomy was done with prompt cure of his bedwetting. Meatotomy cured the enuresis in this case obviously.

Case 4. C. S., an 8-year-old white female, had been wetting the bed at least once a night since birth. During the day she was continent. Examination revealed a normal urine, normal bladder and some enfolds in the posterior urethra (between 11 and 1 o'clock). She responded dramatically after the examination, and thereafter urethral sounds were passed at intervals, depending on the recurrence of bedwetting. At the present time she is able to go several months between treatments. Local treatment has relieved, but not cured, this enuretic child.

Case 5. B. S., a 6-year-old white female, had partial incontinence of urine during the day (if she became frightened or excited) and multiple bedwetting every night. Examination was not satisfactory due to lack of cooperation by patient as well as parents. Apparently there was no organic trouble present. Several treatments were attempted but the child and her parents reacted so emotionally to each one that it was decided best to postpone treatment temporarily until the child grew older or out-grew the condition. This is a failure in the treatment of enuresis.

TABLE I. *Results in Treatment*

	Cases	Per Cent
Cured without operation.....	28	56%
Cured with operation.....	14	28%
(1) transurethral bladder neck resection (girls)	9	
(2) transurethral bladder neck resection and meatotomy (boys).....	4	
(3) meatotomy (boys)	1	
Improved without operation.....	2	4%
Improved with operation.....	2	4%
transurethral bladder neck resection		
Failures (no operation).....	4	8%
TOTAL.....	50	100%

DISCUSSION

Table 1 shows that 84 per cent of these 50 patients were cured of enuresis; 56 per cent by urethral instrumentation alone, while 28 per cent required some operative procedure. Eight per cent (or four cases) were improved; half of these were relieved by instrumentation while the other two required some operative procedure. There were 8 per cent failures; none of these was operated on. For classification as a cure a case had to have complete relief of nocturnal and diurnal enuresis (though about half of these cases require an occasional urethral dilation). Patients who are improved have been relieved of nightly bedwetting but still relapse once or twice a month.

TABLE 2. *Conditions Found in 50 Cases*

	Cases
Urethral stricture (or stenosis).....	46
Meatal stricture.....	5
Bladder neck enfolds and/or polyps.....	17
Urethral granulations.....	40
No pathological condition.....	4

It must be realized that most cases of enuresis are handled by the family physician or pediatrician. These children are given a thorough trial of the punishment and reward type of therapy, awakening schedules, and many drugs. The refractory cases are seen by the urologist. Only four patients had no previous medical treatment out of this series of 50 cases.

Treatment by the author included: (1) examination with panendoscope (often this alone will produce a dramatic cure), (2) massage of the trigone through the rectum, (3) trial of tincture of belladonna, (4) weekly urethral soundings.

The operative procedures included: (1) transurethral resection and/or fulguration of the bladder neck, verumontanum, or posterior urethral valves, (2) meatotomy on boys (none has been done on girls). A meatotomy was done before a transurethral bladder neck resection on all male patients; and a meatotomy alone cured one boy. The failures included cases in which treatment caused such emotional shock that it was not thought advisable to continue treatment. Perhaps therapy can be started again later.

SUMMARY

Urinary incontinence in children is fairly frequent. Day control by 2½ and night control by 3 years of age is obtained by the average normal child. Approximately 15 per cent of all children have enuresis. Hereditary, environmental and psychogenic factors complicate the treatment of enuresis. Too often a diagnosis of psychogenic enuresis is made without a thorough investigation of the urinary tract. No case of enuresis with pyuria or hematuria should be dismissed without a complete urological survey, but a normal urinalysis does not rule out organic trouble. Posterior urethral valves, strictures, ectopic ureteral orifices, urethral or bladder diverticulum, verumontanum hypertrophy, bladder neck hypertrophy or polyps, nerve lesions, and exstrophy of the bladder are the commonest organic causes of enuresis.

Treatment has been unsatisfactory in the past. Drugs, psychotherapy and local treatments have been used with varying success. Improvement following local treatment, followed by relapse, indicates that transurethral resection or fulguration may be curative. Relapses can be re-treated with complete cure ultimately.

Fifty cases of enuresis are discussed, with representative cases presented in each group. An overall cure rate of 84 per cent was attained in the treatment of enuresis, and all cases (except the four failures) have been followed at least six months.

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INTUSSUSCEPTION DUE TO MECKEL'S DIVERTICULUM. (Glasgow Medical Journal, 31:255, Aug. 1950). Aitken reports an eight-month-old infant with an irreducible intussusception caused by a Meckel's diverticulum. Treatment consisted of resection of the involved segment of the bowel and side to side anastomosis. The child recovered. The treatment is probably the best for an irreducible enteric intussusception. Detailed examination of the symptoms and signs does not suggest any method of differentiation between this type of intussusception and the usual enterocolic type when the patient is an infant, although the previous history and duration of the symptoms may be helpful.—*Journal A.M.A.*

ARSENOXIDES TO PREVENT TRANSFUSION SYPHILIS. (Deutsche medizinische Wochenschrift, Stuttgart, 75:1021, Aug. 11, 1950). Brock and Conradi used fresh, citrated blood, to which an arsenoxide preparation had been added to prevent the transmission of syphilis, for transfusions in 661 infants and 278 children. The blood was usually given in divided transfusions, over two or three days. No undesirable secondary effects were observed. The clinical effect of the transfusion was not altered, and there was no significant difference in the resistance of the erythrocytes in three day old citrated blood, whether or not the arsenoxide preparation had been added.—*Journal A.M.A.*

A CASE OF SIMULATED DYSLEXIA*

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Chicago,

During the last three decades the achievements of the medical profession in the prevention of disease have been phenomenal. As a result of this health program, the medical care of children and adolescents has become an art of keeping them well through immunizations, oral hygiene, adequate nutrition and judicious administration of drugs. The acute exanthemata, which assumed epidemic proportions formerly, are now relatively rare.

What does this medical progress hold for the future? With the advent of the antibiotic drugs and other advances in diagnosis and treatment, there is promise of still further decline in complications and periods of convalescence. It would seem that as pediatricians, and physicians in general, are becoming more and more restricted in medical practice per se, they must expand their service in the field of educational achievements, particularly with their younger patients. Such a field may be reading disability.

There are millions of school children who need special aid in correcting their reading disability; and when we organize our educational and medical facilities for it, grade failures and possible delinquency caused by failures will drop rapidly. Many children experience difficulty in reading though they have normal or even superior intelligence. The inability to learn the art of reading is usually a characteristic symptom with a syndrome—dyslexia. It has many ramifications which extend into the physical status, and include emotional adjustments and attitudes, not only of the child, but of the parents and teachers as well.

The purpose of this paper is to present a case of simulated dyslexia and to bring out the complex factors which created that problem.

Junior, an only son, eleven years of age, in the fifth grade, was subjected to an unreasonable educational regimen by his parents, especially by his mother, who wished their child to become a "genius", and thus recover the prestige of the family.

Innately, everyone seems prone to remodel the universe to suit his own fancy, and "then put a fence around it". For some

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reason, either actual or imaginary, this desire is inhibited, causing the individual to persist in fear of criticism or deprivations. Even if the condition exists unconsciously, varying degrees of guilt may result. As this feeling of guilt persists, there develops a feeling of uneasiness and apprehension—an evidence of anxiety. This anxiety represents unconscious conflicts of absurd fears. Anxiety, then, is an expression of such a situation even though it is not recognized by the patient.

When application to the Institute was received, the mother of Junior was told there would be several months of waiting because there was a long list of applicants. During that interim both the mother in her anxiety and the principal of the school, under pressure of the mother, contacted us several times asking for help as soon as possible.

Junior's school difficulties were many as enumerated by his mother: doesn't read well, has difficulty with spelling, works too slowly, writing is not good, doesn't hear well, doesn't sound *th*, has to sit on front seat in school because of his sight.

In order to detect and correct the physical and mental abnormalities which caused such a syndrome, the whole personality of the child had to be taken into consideration. This required a complete history covering every aspect—physical, mental, intellectual and emotional. The social environment and educational achievements were evaluated with special attention paid to the senses and equipment primarily concerned with reading disability, such as ocular, auditory and vocal functions.

PHYSICAL

The family history was entirely negative, except that there was present some allergy in his father's family. His birth was normal and he weighed eight pounds. The mother gained twenty pounds during pregnancy. The boy walked at fourteen months, talked at eighteen, and enuresis was controlled at about eighteen months. He had had measles, chickenpox, and symptoms of scarlet fever; the tonsils were removed at five years which benefited him materially in preventing colds. He had had recurrent attacks of rhinitis.

The physical examination revealed swollen nasal mucosa with hypertrophied turbinates. He had some difficulty in breathing, showing a probable allergic condition. This could have interfered

with his sleep, preventing proper rest and relaxation. Otherwise, the examination was negative, and the laboratory findings were within normal limits.

The hearing was normal; he could hear a whisper and ordinary conversation. The audiogram was normal.

He had been wearing glasses since he started school. The mother decided the child should have glasses, for she didn't want him to have any trouble. The correction was: right lens +0.25—+1.00 ax 90, left lens +1.75 ax 90. His vision in both eyes with his glasses was 20/70. A homatropine refraction was done and normal vision was found in both eyes, so the glasses were removed. Fusion and stereopsis were excellent. Neither eye was suppressed when tested for dominance.

<i>Ductions:</i>	<i>Diplopia</i>	<i>Return</i>
Distance Ad.	12	0
Ab.	10	4
Near Ad.	4	8 Base in
Ab.	16	12

There were 3° exophoria for distance and 14° exophoria for near.

The reading graph, on material of the fifth grade level, showed the rate to be 220 words per minute, with 100 fixations per 100 words, giving the span of recognition as 1.0. There were 22 regressions per 100 words.

The voice showed some indistinctness and confusion on "s" and "th" sounds. It was felt that if speech training caused any pressure and tension, it would be better to omit it.

PSYCHIATRY

When asked about her son's problem the mother replied: "I have felt that my boy's trouble was basically physical. I think his difficulty in school work is caused by that condition." In discussing the problem and its causes, the mother repeated many times, "I don't know". One soon gained the impression though, that she was quite investigative, and intensely concerned with the details of the problems.

When asked about the emotional basis for such a condition, the mother said: "*He is an only child*; his circle of friends is quite

restricted; he dislikes to eat with other children at school, and complains of their manners. However, he has adjusted quite well to the noon hour."

Junior's personality was described by the father as average, except that he was a little slow to obey. The mother remarked that the boy was like an adult in some ways, but was quite a child in spite of it. While he valued his toys as an adult, his reactions were childish if others interfered.

He was breast fed, with supplementary feedings, and weaned at fourteen months. At that time he was a thumbsucker which continued until he was four years old. This may have caused some protrusion of the upper teeth. By his own admission he recognized that thumbsucking was a habit. When reminded by his mother that "he was acting like a baby, and preventing a baby brother or sister", he stopped the habit. He talked early and continuously — quite typical of his mother's speech in quantity and quality.

Junior's paternal grandmother died when his father was six years old, so his father was raised in a boarding school. Then Junior's grandfather remarried. Apparently this woman cared nothing for the step-children; seldom saw them in fact. The paternal grandfather died at the age of twenty-six and from then on the father of the patient had no home life.

The mother had the equivalent of a three-year high school education. She could not continue because of illness. She was quite ambitious to keep up with "modern thought," and regretted her inability to extend her formal education. Her mother and father are living and she is the product of a normal, well-integrated home. Her family were poor but well-balanced emotionally. There were four sisters and three brothers. The father was devoutly religious and believed in a large family. The mother of the patient had a deep feeling of guilt for limiting the number of her own children. She used birth control for one year but had miscarriages after that.

The patient is not especially desirous of any brothers or sisters. He did not seem to mind being alone. The patient is quite satisfied with his home life and play arrangement. The impression of the boy is as follows: He expresses himself well, is calm and well behaved and talks out spontaneously. His speech and attitudes are somewhat advanced for his age.

PSYCHOLOGY

Stanford Binet verbal.....	I.Q.	133
Grace Arthur performance.....	I.Q.	106

Progressive Achievement Tests—Elementary Form A

	Grade Placement	Percentile Rank
Reading vocabulary	7.3	85
Reading comprehension	7.9	95
Total	7.6	90
Arithmetic reasoning	6.5	75
Arithmetic fundamentals	6.1	70
Total	6.2	70
Language	7.4	90
Spelling	6.5	75
Total	6.9	85

Even with this superior performance in school achievement, he had simulated dyslexia for he apparently rebelled and even refused to apply himself in the usual school situations.

In spite of all the pressure and interference exerted by his mother, he had developed an unusually well-balanced and integrated personality. Other children under similar circumstances might have been greatly frustrated and maladjusted.

California Test of Personality—Elementary Form A

	Percentile Rank
Self adjustment	80
Social adjustment	75
Total adjustment	80
Self reliance	90
Sense of personal worth.....	65
Sense of personal freedom.....	65
Feeling of belonging.....	65
Social standards	90
Social skills	65
Freedom from anti-social tendencies.....	65
Family relations	90
School relations	50
Community relations	55

The psychologist's report was as follows: "The problem does not seem to revolve about the boy but rather about the mother. I suggest that she be informed of her son's superiority in intelligence and achievements and that it be pointed out to her that she is magnifying the problems of her son. Perhaps she is actually creating them. The real problem seems to be that of determining why the mother is convinced that there is a serious problem.

"The patient is neither a reading problem nor a spelling problem. There are some indications that he is being forced into the role of a perfectionist. This could be corrected if the mother can be persuaded to modify the demands she makes upon him. She should be encouraged to allow him freedom to find his own way in life, to discipline himself in regard to his studies, and to develop his creative and play potentials."

EDUCATION

The patient didn't go to kindergarten. Because of illness he was absent from school a great deal during first grade. The mother claims that his fine report cards of progress in first grade were due to business transactions between herself and the principal, whom the first grade teacher feared.

The father was in service when the child was in the first and second grade, which was a great blow to the child. This threw the financial burden on the mother. She provided well for the child's physical care, but neglected the emotional side of his life.

The patient was sent to an adjustment teacher in the second grade to receive extra help. Then the school was changed, and he was obliged to repeat 2B. At present he studies piano privately, but isn't particularly enthusiastic about it.

Oral Reading:

1. Dolch list of 200 most frequently used words—100%—rapid dictation.
2. Initial consonant sounds—excellent (even went on to tell what word each combination reminded him of: i.e., splash, scr-scream, sw-sway).
3. Grays set IV #1—5th Grade level.
 - (a) rate—180 words per minute.
 - (b) excellent interpretation and expression.
 - (c) comprehension splendid—excellent vocabulary.

Silent Reading:

1. Group IV #3—5th Grade level.
 - (a) 210 words per minute.
 - (b) no bad habits (no lip movements).
 - (c) comprehension—excellent.

Motivation to encourage child to read was not necessary; he enjoyed it.

SUMMARY OF FINDINGS

After the staff conference the following summary of the findings were made, and the recommendations passed on to the parents:

1. Very superior intelligence, favorable to verbal over performance intelligence. Superior achievement. In some instances achievement was two years in advance of chronological age.
2. Adjustment above average.
3. Chief difficulty is unfounded anxiety of mother. Mother is in need of realistic information about son. Both should be desensitized to the problem. The boy needs broad interests and social contacts, competitive play and hobbies. He should be permitted to grow up as an individual personality with responsibility.
4. Advise further study of the throat and nose condition for allergies.
5. Remove glasses—start duction training.
6. Call attention to indistinctiveness of speech.
7. Encourage him to read for enjoyment.

After eight months' treatment and counseling, his visual functions were normal, his speech had improved, his allergic condition greatly diminished, and his mother had become much less anxious, although she still liked to put on some pressure. At that time he was allowed to discontinue treatment. A notation in the record called attention to the patient's statement: "I read everything in sight, and am on the honor roll at school."

The author wishes to thank Dr. Raymond W. McNealy for his interest and influence which made it possible for the Dyslexia Memorial Institute to occupy space in the new Wesley Memorial Hospital.

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CLINICAL REVIEW

In order to encourage the writing of clinical articles by recent graduates or senior medical students, the ARCHIVES will publish monthly at least one such paper from the classes of Doctor Reuel A. Benson, New York Medical College, New York, and Doctor Philip Moen Stimson, Cornell Medical School, New York. Other interested medical schools are cordially invited to submit student papers for consideration.

HEMOPHILIA*

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One of the unique problems in pediatrics is the control of the hemophiliac child. The pediatrician is usually the first one who is called upon to see this child and upon his shoulders rests not only its life, but the responsibility of treatment throughout its various bleeding episodes. What is more important than this is the fact that psychic as well as somatic treatment must be given since the nature of the disease is one which demands curtailment of certain activities in order that the possibility of severe exsanguination may be avoided. Yet at the same time there is a desire, as in all diseases of children, to allow them to grow and mature as closely as possible at the same level as the healthy child. It is with this problem in mind, that etiology, diagnosis and treatment shall be discussed.

Perhaps no disease in all medicine has such a romantic background as hemophilia. It was first described in the Talmud by the ancient Jews who became acquainted with it via the ritual of circumcision. Later, Hippocrates described the condition and today one of its popular aspects stems from its existence in the royal families of Russia and Spain. We know that it is an hereditary disease transmitted in a Mendelian recessive manner from grandfather to grandson; the female carrying the defect in her chromosomes.

Thus, if a female carrier (ox^x) marries a healthy male, one-half of the daughters are carriers and one-half of the sons are bleeders. If a normal female (xx) marries a bleeder male (oxy), all the sons will be normal but all the daughters will be carriers (ox^x).

*Submitted as partial fulfillment of the requirements of the course in Senior Pediatrics at the New York Medical College, Flower and Fifth Avenue Hospitals.

If a female carrier (oxx) marries a bleeder male (oxy), the following combinations result: ooxx = This is a female bleeder and although it is theoretically possible, it actually never happens possibly because such females usually die at birth. oxx = This is a female carrier. oxy = This is a bleeder son. xy = This is a normal son.

Having dealt with the hereditary aspects of the disease, we come to the discussion of its possible etiology. This has received new impetus since the last war because of the fact that much scientific work has been done in separating plasma fractions that seem to be able to terminate bleeding episodes in hemophilia. Basically, it is known, that, in order to stop hemorrhage, two factors operate, the contractility of the vessel walls and the formation of a clot. The defect in hemophilia lies in the latter. To make an attempt at understanding the clotting defect necessitates that normal clotting be included in the discussion.

Graphically represented, it occurs as follows:

1. Prothrombin (plasma) + calcium + thromoplastin (platelets) = thrombin.

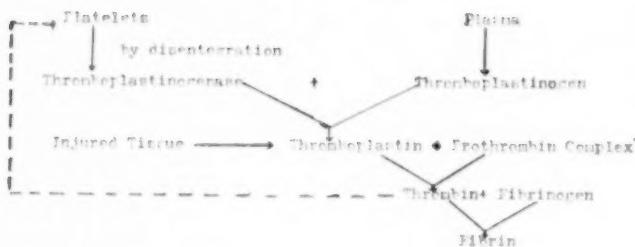
2. Thrombin + fibrinogen = fibrin.

It can be assumed that in hemophilia, the prothrombin is not deficient since the protrombin times are normal. Calcium, also, is not a factor, since it has been proven that, although, the element is highly essential to clotting both *in vivo* and *in vitro*, the human being, no matter how low his calcium levels are, will always have enough to coagulate his blood. However, when thromboplastin is considered, the first step towards etiology is approached. This substance is found in *platelets*, *plasma*, brain, lung, thymus, and many other places, and according to the clotting reaction, must be released or be present in order to liberate thrombin and thus allow the equation to proceed.

The next consideration is whether the platelets are abnormal or whether the plasma is abnormal in the hemophiliac. As far as the platelets are concerned, it is known that they are not quantitatively deficient as in the purpuras but that the counts remain within normal limits. However, they may have a *qualitative* deficiency and this led many investigators to the theory that the platelets of the hemophiliac were too stable and did not disintegrate to release thromboplastin. The beneficial effects of transfusing the

bleeder, they considered, came from the fact that one immediately added large quantities of normal platelets into the blood stream. It was pointed out later, however, that one could transfuse small quantities of *plasma* instead of whole blood and still manage to reduce the coagulation time to normal. In the laboratory, by means of silicon-treated apparatus and high speed centrifugation, platelet-free plasmas can be prepared, and it has been found that adding normal platelet-free plasma to hemophiliac blood causes coagulation to occur. If a platelet-free hemophiliac plasma is added to normal blood, no coagulation occurs. Thus, although these cells are important, at least of equal importance is the plasma factor. Leaving them out of the discussion for the moment, on the basis of the above simple experiment, two conclusions may be reached. Either normal plasma has something to cause clotting that the hemophiliac plasma lacks, or the latter has an anti-clotting factor absent in the normal. This latter theory forms the basis of the work of Tocantins, who feels that the hemophiliac has an anticoagulant substance or a clotting inhibitor present in his blood. Equally able investigators do not feel that there is enough evidence for the presence of a clotting inhibitor, but they feel, like Quick, that normal plasma has something that the hemophiliac hasn't got. If washed hemophiliac platelets are added to normal platelet-free plasma, coagulation takes place, showing again that the platelets appear to be quite normal but that some plasma factor is needed. Quick has called this *plasma factor thromboplastinogen* which is the precursor of thromboplastin. The hemophiliac has no thromboplastinogen. In the normal this precursor is present in the plasma in the inert and inactive form.

What then does the activating? To answer this forces a reconsideration of the importance of the platelets which previously were casually dismissed. This importance can be illustrated by the fact that when oxalated hemophiliac plasma is highly centrifuged, removing all of its platelets, it clots much more slowly than the same plasma subject to a rate of centrifugation that does not remove the platelets. The necessity of these cells lies in the fact that they supply an enzyme, thromboplastinogenase, which Quick thinks converts thromboplastinogen to thromboplastin. The latter in turn reacts with the prothrombin complex to produce thrombin, and thrombin with fibrinogen forms fibrin. Accordingly a new graphic representation of clotting is possible:



Obviously the more thromboplastinogen present in the plasma, the more prothrombin should be converted to thrombin and certainly the *lack* of this vital clotting substance means that little or none of the prothrombin can be converted. If one could measure the prothrombin consumed or left over during a clotting reaction, one would indirectly be measuring the quantity or the amount of activity of thromboplastinogen. It is to be remembered that in the hemophiliac, the prothrombin is normal both in quality and quantity but, due to the lack of thromboplastinogen being converted to thromboplastin, very little prothrombin can be converted to thrombin. Comparing this prothrombin conversion of the bleeder with the normal, one finds that the amount of prothrombin consumed in the bleeder's clotting is so small that it cannot be measured, whereas normal clotting converts 80 to 90 per cent of its prothrombin to thrombin within one hour. This is the basis of the prothrombin consumption test, which not only determines the activity of thromboplastinogen but can also be used as a diagnostic test for hemophilia. It is done by taking 2 cc. of hemophiliac blood, allowing it to clot at 37° C., determining the prothrombin remaining in the serum by the one-stage technique and comparing it with the prothrombin time of a sample of unclotted blood. The prothrombin consumption of normal blood is 16 to 35 seconds whereas the bleeder's consumption of prothrombin is only 9 to 12 seconds. In fact, after the hemophiliac blood clots, as much prothrombin is present before as after the clotting.

Returning again to the platelets, it can be shown that they are quite helpful in prothrombin-thrombin conversion. If blood is withdrawn in silicon-coated apparatus, and centrifuged at 3,500 R.P.M. for seven minutes, again a platelet-free plasma results. Doing a prothrombin consumption test on this and comparing it

with a test done on a platelet plasma, one finds that the latter has a much greater proportion of prothrombin conversion. Thus the platelets help not only by supplying a clotting enzyme but by aiding the conversion equation. Actually these cells of the hemophiliac are as active as those of normal blood.

An interesting experiment was done comparing the effect of progressive dilutions of thromboplastin on the prothrombin time of normal and hemophiliac plasma. Two sets of platelet-free plasmas were prepared, the normal and the bleeder type. To these were added increasing dilutions of thromboplastin. Oddly enough, both the normal and the bleeder plasma were coagulated to the same degree, meaning that if the prothrombin-thrombin conversion could get *started* in the bleeder, it would have the same conversion rate as in the normal. These results are contrary to the theory that hemophiliac blood contains an antithromboplastic agent.

In returning to the Quick concept of coagulation of blood, we see that there is an arrow leading from the produced thrombin to the platelets. It is believed that thrombin has the task of labilizing these cells, which is an essential step in their lysis. The more thrombin produced, the more platelets are disintegrated which in turn liberate more thrombin. It is a chain reaction which gains momentum and completes clotting in a few minutes. The trouble with the hemophiliac is that the reaction never gets started. No thromboplastinogen can set it into motion, thus the thrombin is never sufficient and therefore the platelets do not disintegrate but remain intact. Thus we can still call the defect in hemophilia the stability of the platelets, although this is not intrinsic but contingent upon the lack of thromboplastinogen.

So far we have not discussed the coagulation time in the bleeder. We know that it is prolonged. Experimentally it is done by coating a glass rod with collodion and placing it in a test tube containing one cc. of blood. By carefully withdrawing the rod at fixed intervals, the beginning of clotting can be determined by a minute thread of fibrin adhering to the rod. A hemophiliac blood tested in this way may take ten minutes to form the first thread, but yet require at least two hours before the solid clot is formed. Even the solid clot sometimes may not be the measure of complete coagulation. If highly diluted thromboplastin is added to this blood, the clotting time will be shortened to normal, again demonstrating the

necessity of this factor to clotting. Recognizing the limitations of this test, it has been reported that even to reduce it to near normal does not necessarily assure good hemostasis.

To review, there are three steps in the clotting of blood:

1. Thromboplastinogen + platelet enzyme = thromboplastin.
2. Thromboplastin + calcium + prothrombin = thrombin.
3. Thrombin + fibrinogen = fibrin.

In the hemophiliac there is no thromboplastinogen to convert to thromboplastin in the plasma and as a result the prothrombin-thrombin conversion is poor as measured by the prothrombin consumption test. No fibrinogen is converted to fibrin and defective hemostasis results. As soon as the thromboplastinogen is supplied via transfusion of normal plasma, the platelets can disintegrate, releasing their enzyme which now has something upon which to act and a reasonably normal coagulation is established.

The diagnosis of hemophilia would be simple if the textbook triad of bleeding tendency from birth, prolonged coagulation time, and hereditary history were present in all cases. It is to be remembered, however, that bleeding may *not* appear early in life simply because the infant is usually very well protected against trauma, and any trauma that does appear may not be of a significant nature. Occasionally it is a tonsillectomy or a tooth extraction that reveals the disease. As far as the hereditary tendency is concerned, in one-third of the cases seen by Quick, no hereditary pattern was established. This, of course, is readily explained by the fact that the disease may have been transmitted through several generations of women and the child seen is the first male in a long while. But knowing this does not help or deter the making of a diagnosis.

The coagulation time is usually prolonged but, in some cases, not very much prolonged, and in the mild hemophiliac, it may be normal.

Interestingly enough, hemophilia is the most common blood disease of childhood exclusive of the purpuras, and any persistent tendency to bleed should tentatively be called hemophilia until proven otherwise. This bleeding needs some injury, small or large, to initiate it. The hemophiliac does not hemorrhage spontaneously, and his bleeding, once started, is not characterized so much by its severity as by its persistent oozing. The hemorrhage may cause, hemarthrosis, hemothorax, and bleeding into the

abdomen or brain. Sometimes the only characteristic is the presence of large ecchymotic areas.

Laboratory data may help the making of a diagnosis. The coagulation time, not only of the blood but also of recalcified oxalated plasma, is prolonged. The latter is done by oxalating the blood and subjecting one sample to high centrifugation and another to low centrifugation. The first sample will clot much more slowly than the second in the hemophiliac. In the normal both samples clot at the same rate, proving that clotting is not influenced by the speed of revolution and therefore the number of platelets present. The platelets are normal in number in the bleeder; the clot retraction is normal once the clot is formed; the tourniquet test is negative; and the prothrombin time is normal as well as the bleeding time. Quick includes the doing of the prothrombin consumption test as described above.

Venepuncture is considered to be without danger since the elasticity of the blood vessels is usually sufficient enough to close the wound. Even bone marrows may be done if a small needle (24 gauge) is used. The marrow studies will be normal during the inactive stages. Some investigators report an increase in the number of megakaryoblasts and megakaryocytes. After episodes of hemorrhage the usual compensatory marrow will be seen. It should be remembered that all or most of the findings can be within a normal range if the child is not in an active episode. Thus extreme care is necessary in making the diagnosis.

In treating the hemophiliac child the defeatist attitude is never justified. No cure as yet exists but much can be done to ameliorate the bleeding tendency and rehabilitate the patient to normal life. In the management of these bleeders, three periods have been recognized. The first encompasses all the nonspecific measures that have been used. The second includes the all-important fact that, although fantastic quantities of nonspecific can be used, the quickest way to stop the bleeding is to transfuse with blood or plasma. The third period is a new era in which an antihemophilic fraction has been isolated that better manages the hemophiliac and helps toward the ultimate solution of the enigma of hemophilia.

A wealth of nonspecific measures have been used with varying degrees of success, most of them aiming towards increasing the available thromboplastin. Snake venom has been tried but has the

disadvantage that it causes clotting throughout the body whereas what is desired is a local effect. Packing has the disadvantage that it may control bleeding for a short time, but its removal usually starts the hemorrhage again, as well as the fact, that packing to be good must be tight, and this may cause sloughing of tissues. Special thrombin and globulin preparations have been used somewhat successfully but it must be reported that they are only temporary measures. Ovarian hormones, placental extracts and foreign protein sensitization must only be mentioned.

But as stated previously, the quickest way to stop the hemorrhage of a hemophiliac is to start transfusing. All investigators, whether they feel as Howell does that the defect is in the platelets; as Brinkhaus who subscribes to a plasma factor; as Quick who feels that thromboplastinogen is the lacking necessity; as Ferguson who feels the defect is the lack of available trypsin, are in agreement that transfusion is the specific answer.

The question then to be raised is what to transfuse. Whole blood remains the most effective, but has the inherent difficulties that it must be compatible and that it must be prepared properly. It will save a life but do little to prevent chronic disability. Typing limits the number of possible donors and sometimes intragroup incompatibilities develop. Together with this, whole blood cannot be stored over long periods of time without losing some of its effect. Thus blood limits itself practically to the surgical emergency.

The problem seemed to be answered when plasma given to the hemophiliac gave a prompt reduction of the coagulation time. This obviated the difficulty of typing, preparation and limitation of use.

Human plasma can be dessicated in a partial vacuum at a low temperature and stored to be used when necessary. The white compound produced can readily be dissolved in physiological saline, and what is more important, it can act in a manner similar to fresh citrated blood. This plasma can also be stored by freezing which will keep the antihemophilic activity indefinitely, but if thawed in a waterbath of 37° C., it must be used immediately for its activity will diminish very rapidly. The era of plasma infusions naturally raised the possibility of frequent treatments in order to keep the coagulation time within normal limits so that trauma, when subsequently sustained, would not cause any great hemorrhage. The

effect of a single transfusion is so evanescent that it must be given frequently in order to maintain a reduced clotting time.

Alexander and Landwehr treated their patients weekly for ten to twenty months giving 150 cc. of plasma each week. During any bleeding episode they were given 100 cc. to 200 cc. once or twice daily. The plasma transfusions were always followed by a pronounced drop in the clotting time to normal levels. The latter remained low during the first twenty-four hours, increased gradually during the subsequent day, and unless another plasma injection was given, returned to its previous levels in seventy-two hours. Despite the peaks in the coagulation time, the average time was greatly reduced. Although Munroe and Jones reported cases where patients became refractory to such treatment, Alexander and Landwehr feel, "that there is no evidence that by maintaining the coagulation time at levels more closely approximating the normal, the blood coagulation defect is any less at the end than at the beginning of the therapeutic regime." They also pointed out that the duration of the antibleeding effect varied with the dose. Greater effects could be produced with larger doses of plasma up to a certain point, but after this point had been reached the increase in dosage did not appreciably decrease the coagulation time. In any case, the intramuscular route is definitely less effective than the intravenous. As much as 15 cc. into each buttock failed to reduce the coagulation time as much as 1 cc. intravenously. It was universally noted that fewer ecchymotic areas occurred and that trauma, which ordinarily would have caused moderate hemorrhage, caused no bleeding at all. The only time that these patients had severe hemorrhagic episodes was when they went off on holidays or vacations or when they were lax in returning for treatment. In all cases they assumed more active types of lives including many sports in which they had never been able to participate before. As long as they remained on plasma therapy they were remarkably free from bleeding. If this work is confirmed, and if the development of refractoriness is more carefully investigated, perhaps it will offer a mode of treatment especially during the ages when children are most susceptible to trauma. The authors are definite in stating that the coagulation defect under therapy did not become worse; that they had no evidence of refractoriness; that important hemorrhages occurred when there were lapses of

therapy, and when the clot-promoting effects of the last administration of plasma had largely disappeared. In conclusion, the intravenous injection of a solution of human plasma, which has been frozen and dried within a few hours after removal from the donor, decreases the coagulation time as well as fresh citrated blood; can be used irrespective of donor; can be accumulated in stores suitable for treatment and can rehabilitate seriously disabled patients when given in repeated injections.

We now come to the new era where antihemophiliac fractions of the plasma have come into importance. This work received a great impetus after the last war when pooled plasma was available in large quantities and was distributed to various laboratories for experimental work. Dr. Edwin Cohn's laboratory produced protein fractions that had a marked antihemophiliac activity. These fractions were definitely associated with the euglobulins of the blood. Separation of the antihemophiliac factor or factors from fibrinogen and prothrombin has been accomplished with great difficulty since the fractions have a great affinity for both of these substances. Also there is a loss of potency due to the fractionating process itself. However, the greatest amount of antihemophiliac activity is in Cohn's fraction 1 and 111-2. The former supersedes all the others in this activity and also contains 60-80 per cent fibrinogen while the latter has 75 per cent beta globulin and contains the bulk of plasma prothrombin. Fraction 1 is the only one that is available for the intravenous use in man. It is interesting to note that when *hemophiliac* plasmas are fractionated, fraction 1 is completely inert as far as preventing hemorrhage is concerned.

Cohn's fraction 1 can be administered to hemophiliac patients by vein with no manifestations of toxicity. Until recently, no preparation made was as active as the plasma from which it was derived. As little as 11 mgs. of fraction 1 has caused an abrupt drop in the coagulation time of the blood when given intravenously. In an acute bleeding episode, 400 to 600 mgs. may be given initially followed by 200 to 400 mgs., if the coagulation time fails to return to normal. These figures relate to the adult and will have to be altered in accordance with the bleeding tendency of the specific child treated. Again, no refractory periods have appeared to the multiple injections, but occasionally an individual will fail to respond to a known active fraction. Duration of the antihemophiliac

effect after an injection is about six to eight hours, after which the coagulation time slowly returns to its preinjection level. The coagulation time returning to normal is being used as the criteria for successful treatment. When optimal amounts of fraction I are given, the results obtained are as satisfactory as the administration of whole plasma. Actually, recently more potent extracts have been prepared, and these fractions have the same ease of administration over whole blood or plasma and can also be used as an alternate if the patient does not respond to anything else. It must be remembered that neither this fraction nor any protein derivative can replace the effect of whole blood in anemia due to profuse hemorrhage. It would seem therefore, that if fractions could be prepared which did not lose any of their potency; if the duration of the effect were long; if they could be used as injection therapy in the nonbleeding phases over a period of months in order to keep the coagulation time within normal limits, the hemophiliac could be well controlled. Concentration of Cohn's fraction has already been accomplished. It now can be reliquified with distilled water and has a protein content equivalent to 60 to 75 cc. of plasma and an antihemophiliac activity of ten to fifteen times the component volume of plasma from which it came. Duration of the effect is anywhere from three to sixty-five hours after injection depending upon the severity of the hemophilia.

So far nothing has been said concerning the local or emergency treatment of the hemophiliac. The first principle in local treatment is to decrease the circulation of the effected part by pressure or the application of cold. This causes a vascular contraction which gives thrombin a chance to accumulate and therefore fibrin is formed and localized. This may be sufficient to shorten the hemorrhage. Remember that heat may convert a minor hemorrhage into a major one. Local application of thrombin or fibrin preparations have their place here.

One of the greatest complications of hemophilia is hemarthrosis. Trauma causes bleeding into the joint which makes it eventually ankylose, leading to an unsteadiness of gait if the joint is in the lower extremities. This very unsteadiness leads to more trauma and thus a vicious circle is established. At first cold is immediately applied to the joint which is subsequently kept at rest. At the same time some infusion of plasma or Cohn's fraction I should

be started to reduce the coagulation time. Then heat may be very cautiously applied to absorb the extravasated blood. Some people aspirate the joint at this point. In any case, light massage, passive exercise and then gradual active exercise is instituted to keep the ankyloses at a minimum. A good physical therapist is of invaluable aid.

Any acute emergency in the hemophiliac which has caused any evidence of blood loss requires that fresh whole blood be immediately given to supply the lost red cells as well as antihemophiliac substance. Plasma may then be given remembering that 50 cc. of freshly restored frozen or lyophilized plasma intravenously will maintain the clotting time of a moderately severe bleeder within a safe range for about 24 hours. If Cohn's fraction is available, it may also be used. If no veins are available, as sometimes happens in children, the intrathecal or the intrasternal route may be tried.

In preparing the patient for surgery, he should be carefully checked with clotting times and prothrombin consumption tests for a period of two to three days before the elective procedure. During the operation, as well as before and after, the bleeder should get blood, plasma or the Cohn fraction. This is done so that sufficient hemostatic power will result in order that a fibrin plug will fill the lumen of the cut vessel during a time in which the vessels are in a state of contraction. It is best to promote anti-bleeding during this physiological state rather than waiting until secondary dilatation occurs.

From the above, it can be seen that the answer in hemophilia is being approached, and in this answer there are at least two factors that are all-important in pediatrics, the medical and the social aspects. The latter forces a consideration of very close cooperation and collaboration between the physician, the medical social worker and the parents, in the education and behavior of the parents as well as in the instructing and training of children in the avoidance of trauma.

This, in itself, means the curtailment of activity which is most undesirable from the psychological point of view, and yet which the very nature of the disease demands. Actually this problem is on its way towards being handled by the advances in the medical control of the disease. It is to be hoped that Cohn's fractional 1 may be used as a prophylactic agent given in repeated injections

as necessary to keep the clotting time of the bleeder child in normal range so that trauma will not result in severe hemorrhage. It may be possible to give it just as the plasma was given in the regime of therapy that was described. In any case an immeasurable aid will be advanced to children who have not yet reached the age where they can realize the effects of trauma to them which is one of the greatest causes of disability. At the very least, this prophylaxis might be given between the ages of three and ten years where the greatest amount of hyperactivity is seen and therefore where the greatest number of hospital admissions occur in hemophilia. The plan offers hope, not only of preventing severe hemorrhage but also of giving the bleeder child a chance for normal life without the constant guarding supervision and with little or no limitations of children's activities. Thus the means are in the process of being supplied whereby the hemophiliac child may well avoid physical crippling and by so doing avoid the more serious possibility of mental crippling.

SUMMARY

A brief discussion of the various theories of the etiology of hemophilia with chief emphasis upon the recent work of Quick is given. Only that experimental data necessary to the understanding of the theories is included.

The diagnostic criteria for hemophilia is listed with special emphasis upon the prothrombin consumption test.

Both specific and non-specific measures are included in the discussion of treatment. The use of plasma and Cohn's fraction I is touched upon with the suggestion that the latter be used as a prophylactic agent. The importance of this suggestion is pointed out in relation to pediatrics.

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CONSTRICKTION OF TRACHEA AND ESOPHAGUS BY DOUBLE AORTIC ARCH. (*Archivum Chirurgicum Neerlandicum*, Arnhem, 2: 170, 1950). Exalto and associates give the histories of three infants, from 5 to 10 months old, who had congenital stridor due to constriction of the trachea and esophagus by a double aortic arch. All three were successfully operated on. Excellent illustrations clarify the descriptions.—*Journal A.M.A.*

FOLIC ACID AND CELIAC DISEASE. (*Archiv für Kinderheilkunde*, Stuttgart, 140: 98, 1950). Filsinger and Kimbel give the histories of two children with severe forms of celiac disease (Herter-Heubner's intestinal infantilism), who had been treated with dietetic measures for long periods, but without much success. When treatment with folic acid was instituted, first by the intravenous and then by the oral route, the weight of the children rapidly increased; the flat glucose tolerance curve, which is characteristic of celiac disease, was replaced by a normal curve, and the formerly reduced erythrocyte count rapidly increased to normal values. The children became much livelier and more cooperative; their appetite improved, the stools became formed, decreased in number and became free of starch and neutral fats.—*Journal A.M.A.*

PEDIATRICS HALF A CENTURY AGO

From time to time the Archives, which was the first Children's Journal in the English language, will reprint contributions by the pioneers of the specialty over fifty years ago. It is believed that our readers will be interested in reviewing such early pediatric thought.

THE HISTORY OF PEDIATRICS AND ITS RELATION TO OTHER SCIENCES AND ARTS

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(Continued from the March issue)

I have been careful not to mention any cause of death that may just as well be and has been studied in the adult: hemorrhages, the many forms of sepsis of later periods of life, poisons, such as carbolic acid and iodoform, intense cold or heat, insolation, etc., for it is my duty to exhibit the relation to forensic medicine of pediatrics only. Forensic medicine has to guard the interests of all. Nothing in all medicine is more difficult than the discovery of the cause of death. The best knowledge of the advanced practitioner, of the pathologist, of the chemist, of the bacteriologist, of the obstetrician, should be at the service of the people. Every European country understands that and acts on that knowledge. Our own Massachusetts has broken away from the coroner's institution, which was a fit authority for a backwoods municipality, but is so no longer for a cultured people of eighty millions. Now and then, even an expert, or a body of experts, *does not* succeed in discovering the cause of death. What shall we say of a system which *now and then does* discover the hidden cause of a sudden death? When the New York State Legislature half a year ago passed a bill abolishing the no longer competent office of coroner, our good cultured mayor, a gentleman and author, vetoed it for the reason that the new law was not perfect. It was not pronounced perfect by anybody; no law is nor ever was. That is why it appears he prefers something that always was and is, and always will be perfect, namely, the absurd incompetency and anachronism of the coroner's office. That is per-

fect. I have not hesitated to express myself strongly and positively, for I have been called upon to speak to you about the relation of pediatrics to other sciences and arts—politics included, than which there is no more profound, practical and indispensable science and art. The greatest historical legislators understood that perfectly well, when they knew how to blend hygiene and religion with their social and political organizations.

One of the greatest questions which concerns at the same time the practical statesman, the humanitarian and the pediatrician, is that of the *excessive mortality* of the young. The Paris Academy of Medicine enumerated in its discussions of 1870 the following amongst its causes: Poverty and illness of the parents, the large number of illegitimate births, inability or unwillingness on the part of mothers to nurse their offspring, artificial feeding with improper material, the ignorance of the parents in regard to the proper food and hygiene, exposure, absence of medical aid, careless selection of nurses, lack of supervision of baby farms, general neglect and infanticide. If there be anybody who is not quite certain about the relationship of sciences and arts, he will still be convinced of the correlation and cooperation of ignorance, indolence, viciousness and death, and shocked by the shortcomings of the human society to which we belong. Most of them should be avoided. Forty per cent of the mortality of infants that die before the end of the first year takes place in the first month. That is mostly preventable. A few years ago the mortality of the infants in the Mott Street barracks of New York City was 325 *per mille*. Much of it is attributable to *faulty diet*.*

Amongst those who believe in the omnipotence of chemical formulae, there prevails the opinion that a baby deprived of mother's milk may just as readily be brought up on cow's milk; that is easily disproved. In Berlin they found that amongst the cows'-milk fed babies under a year the mortality was six times as great as amongst breast-fed infants. Our own great cities gave us similar, or slightly smaller, proportions, until the excessive mortality of the very young was somewhat reduced by the care bestowed on the milk, introduced both into our palaces and

* Measures taken for the purpose of obtaining wholesome milk are not quite new. Regulations were given in Venice, 1599, for the sale of milk. Milk and its products of diseased animals were forbidden. The Paris municipality of 1792 enjoined the farmers to give their cows healthy food. Coloring and dilution of milk were strictly forbidden, and in 1792 they knew in France how to punish transgressors.

tenements. Milk was examined for bacteria, cleanliness, and chemical reaction. It was sterilized, pasteurized, modified, cooled, but no cow's milk was ever under the laws of nature changed into human milk, and with better milk than the city of New York ever had, its infant mortality was greater this summer than it has been in many years.

That hundreds of thousands of the newly-born and small infants perish every year on account of the absence of their natural food is a fact which is known and which should not exist. Why do we kill those babies or allow them to be killed? Why is it that they have no breast milk? A large number of women work in fields, still more in factories. That is why their infants cannot be nursed, are farmed out, fed artificially, with care or without it, and die. It is the misrule prevailing in our social conditions which compels them to withhold milk from the infant while they are working for what is called bread for themselves and their families. Many of these women, it is true, would not have been able to nurse their newly-born, for their own physical condition was always incompetent. The same may be said of women in all walks of life. Insufficient food, hard work, care, hereditary debility and disease, tuberculosis, alcoholism of the woman's own parents, modified syphilis or nervous diseases in the family—aye, the inability of her own mother to nurse her babies, are ever so many causes why the mother's fountain should run dry. Statistics from large obstetrical institutions (Hegar) prove that only about 50 per cent of women are capable of nursing their offspring for merely a few weeks. In the presence of such facts what are we to say of the refusal of well-situated and physically competent women to nurse their infants? I do not speak of the "400," I mean the 400,000 who prefer their ease to their duty, their social functions to their maternal obligations, who hire strangers to nurse their babies, or worse yet, who make-believe they believe the claims of the infant food manufacturers, or are tempted by their own physicians to believe that cow's milk casein and cow's milk fat may be changed into woman's casein and fat, that chemistry is physiology, that the live stomach is like a dead laboratory bottle, that the warmth of the human bosom and that of a nursing flask are identical, and that cow's milk is like human milk when it carries the trademark "Certified," or "Modified."

Physiological chemistry itself teaches that the phosphorus combinations in woman's milk, in the shape of nuclein and lecithin are not contained in cow's milk, and that the large amounts of potassium and sodium salts contained in cow's milk are dead weights rather than nutrients, and particularly the large amount of calcium phosphate occurs in a chemical, not in a physiological combination. Only lately, by no means for the first time, Schlossmann and Moro (*Münch. med. Woch.*, 1903, No. 14), have again proved that the albuminoids of woman's and cow's milk are essentially different, both in their lactalbumin and the globulin, and Escherich and Marfan, that every milk has its own enzymes.

The quantitative and many of the qualitative differences of cow's and human milk have been known a long time. No addition or abstraction of salts, no addition of cow's fat will ever change one into the other. But it appears that every new doctor and every new author begins his own era. There is for most of modern writers no such thing as the history of medicine or of a specialty, or respect of fathers or brothers. In modern books and essays you meet with footnotes and quotations of the productions of yesterday that look so erudite, but also with the new discoveries of old knowledge which you would recognize if the quotation marks had not been forgotten by accident. So it has happened that many learn for the twentieth time that the knowledge of the minimum amount of required food is a wholesome thing, that the amount of animal fat in infant food is easily overstepped, that we have discovered that the Dutch had a clever notion when they fed babies on buttermilk with reduced fat; we are even beginning to learn what our old forefathers practiced a hundred years ago, and physiologists taught a third of a century ago—namely, that the newly-born and the very young infant not only tolerate small quantities of cereals but that they improve on it. Indeed, the names of Schiller, Korowin, and Zweifel have been rediscovered. We have also learned—just lately, it appears—what was always known, that morning and night, idleness and work, health and illness, while altering the chemical composition of woman's milk, do not necessarily affect its wholesome character. We are beginning to learn that it is impossible to feed a baby on fanatical chemical formulae, for they are not prescribed by Nature, which allows latitude within certain limits. We are even beginning to learn

that if that were not so there would be no artificially-fed babies alive, and possibly very few participants in the St. Louis Congress of Arts and Sciences.

The inability or reluctance of women to nurse their own infants is a grave matter. From a physical, moral, and socio-political point of view there is only one calamity still graver, that is to refuse to have children at all. It undermines the health of women, makes family life a commercial institute or a desert, depopulates the child world, reduces original Americans to a small minority, and leaves the creation of the future America in the hands of twentieth century foreigners. The human society of the future will have to see to it that no poverty, no cruel labor law, no accident, no luxurious indolence, must interfere with the nursing of infants. I believe in the perfectibility of the physical and moral conditions of the human race. That is why I trust that society will find means to compel able-bodied women to nurse their own infants. Infants are the future citizens of the republic. Let the republic see that no harm accrue from the incompetence or unwillingness to nurse. Antiquity did not know of artificial infant feeding. The first information of its introduction is dated about 1500. Turks, Arabs, Armenians, and Kurds know of no artificial feeding today. It takes modern civilization to expose babies to disease and extinction. I know of no political or social question of greater urgency than that of the prevention of the wholesale murder of our infants caused by the withholding of proper nutriment. May nobody, however, feel that all is accomplished when an infant has finally completed his twelve months. Society and family owe more than life—they owe good health, vital resistance, and security against lifelong invalidism.

But even willing mothers may have no milk. We require a stronger, healthier race, and one that physically is not on the down grade. The nursing question is a social and economic problem like so many others, like the childbearing question, that confront modern civilization.

We are building hospitals for the sick of all classes, and insist upon their being superior to the best private residences; asylums for the insane, neuropathics, and drunkards; nurseries and schools for epileptics, cretins and idiots; refuges for the dying consumptives; and sanatoria for incipient tuberculosis. We are bent upon

curing and upon preventing. Do we not begin at the wrong end? We allow consumptives and epileptics to marry and to propagate their own curse. We have no punishment for the syphilitic and the gonorrhœic who ruins a woman's life and impairs the human race. Man, however, should see that his kind must not suffer. One-half of us should not be destined to watch, and nurse, and support the other half. Human society and the State have to protect themselves by looking out for a healthy, uncontaminated progeny. Laws are required to accomplish this; such laws as will be hated by the epileptic, consumptive, the syphilitic, and the vicious. No laws ever suited the degenerates against whom they were passed, and it is unfortunate that while health and virtue are as a rule not contagious, disease and vice are so to a high degree.

Modern *therapeutics*, both hygienic and medicinal, has gained much by the close observation of what is permitted or indicated or required in early age. Since it has become more humane (remember it is hardly a century since Pinel took the chains off the insane in their dungeons, and not more than half a century since I was taught to carry my venesection lancet in my vest pocket for ready use) and more scientific, so that whatever is outside of strict biologic methods is no longer "a system," but downright quackery—the terrible increase of the latter as a world-plague is deemed by rational practitioners and the sensible public an appalling anachronism. It appears that the States of the Union are most anxious (and have been partially successful) to rid themselves of it, while some at least of the nations of Europe are greater sufferers than we. According to the latest statistics, there is one quack to every physician in Bavaria and Saxony; ten quacks in Berlin, with its emperor and other accomplishments, to every forty-six physicians. Its general population has increased since 1879 by 61 per cent; the number of physicians, 170, 2 per cent; that of the quacks, 1,600 per cent.

One of the main indications in infant therapeutics is to fight anemia, which is a constant danger in the diseases of the young, for the amount of blood at that age is only one-nineteenth of the whole body weight, while in the adult it is one-thirteenth. The newly-born is particularly exposed to an acute anemia. His blood weighs from 200 to 250 grams. It is overloaded with hemoglobin

which is rapidly eliminated, together with the original excess of iron. This lively metabolism renders the infant very amenable to the influence of bacteria, and the large number of acute, subacute or chronic cases of sepsis is the result. Besides, the principal normal food is milk, which contains but little iron. That is why pediatrics is most apt to inculcate the lessons of appropriate posture, so as not to render the brain suddenly anemic, and of proper feeding and of timely stimulation before collapse tells us we are too late, and of the dangers of inconsiderate depletion. The experience accumulated in pediatric practice has taught general medicine to use small doses only of potassic chlorate; large doses of strychnin and alcohol in sepsis, of mercuric bichlorid in croupous inflammations, of heart stimulants, such as digitalis, when a speedy effect is wanted, of arsenic in nervous diseases, of potassic iodid in meningitis; it has warned practical men of the dangers of chloroform in *status lymphaticus*; it has modified hydrotherapeutic and balneological practice, and the theories of hardening and strengthening according to periods of life, and to the conditions of previous general health.

The appreciation of electricity as a remedy has been enhanced by obstetricians, pediatricians and general practitioners. It is but lately that we have been told (P. Strassmann, *Samml. Klin. Vortr.*, 1903, No. 353) that a newly-born and an infant up to the third week are perfectly insensible to very strong electrical currents. The incompetency of mere experimental work, not corrected or guided by practice, cannot find a better illustration, for there is no more powerful remedy for asphyxia and atelectasis than the cautious use of the interrupted or of the broken galvanic current.

The domain of preventive therapeutics expands with the increased knowledge of the causes of disease. That is why immunizing, like curative serums, will play a more beneficent part from year to year, and why the healthy condition of the mucous membrane of the nose, mouth, and pharynx, which I have been advising these forty years as a prevention of diphtheria, has assumed importance in the armamentarium of protection against all sorts of infectious diseases.

Amongst the probabilities of our therapeutical future I also count the prevention of congenital malformations, which, as has been shown, are more numerous than is generally known or pre-

sumed, and are often the result of an intrauterine inflammation. In a recent publication F. von Winckel (*Samml. Klin. Vortr.*, 1904, No. 373) emphasizes the fact that the general practitioner or the pathologic anatomist sees only a small number, that indeed the majority is buried out of sight, or is preserved in the specimen jars of the obstetrician. The known number of malformations compared with that of the normal newly-born varies from one to thirty-six, or to one hundred and two or more. They are met with in relatively large numbers on the head, face and neck—altogether in 53.2 per cent of all the 190 cases of malformation observed in Munich during twenty years. A number of them is the result of heredity, of syphilis or other influences. How many are or may be the result of consanguineous marriages will have to be learned. In all such cases the treatment of the parents or the prohibition of injurious marriages should always be insisted upon. The number of those recognized as due to amniotic adhesions or bands is growing from year to year. Kümmel could prove that of 178 cases, 29 were certainly of that nature. External malformations have long been ascribed to them; proximal malformations, such as auricular appendices, harelip, anencephalia, cyclopia, flattening of the face, anophthalmia, hereditary polydactyly (Ahlfeld and Zander, *Virchow's Archiv.*, 1891), and lymphangioma of the neck, have been found to be caused by amniotic attachments of filaments. Is it too much to believe that the uterus, whose internal changes, syphilitic or others, are known to be very accessible to local and general medication, should be so influenced by previous treatment that malformations and fetal deaths will become less and less frequent?

The problem of the health and hygiene mainly of the older child refers to more than its food. The *school* question is in the foreground of the study of sanitarians, health departments, physicians, and pedagogues. Its importance is best illustrated by the large convention which was organized in Stuttgart, April 1904, as an International Congress for School Hygiene. Pediatricians, pedagogues, and statesmen formulated their demands and mapped out future discussions. Rational pediatrics would consider the following question: Is it reasonable to have the same rules and the same daily sessions for children of eight and perhaps of fifteen years, and for adolescents? Certainly not. The younger the child

the shorter should be the session, the longer and more frequent the recesses. There should be no lessons in the afternoon, or only mechanical occupations, such as copying, or light gymnastics. There should be no home lessons.

The problem of overburdening was carefully considered by Lorinser in 1836, and by many others since. It deals with the number of subjects taught, the strictness and frequency of official examinations, and should consider the overcrowding of school-rooms. We should try to answer the question whether neuroses are more the result of faulty schooling or of original debility, heredity, underfeeding, lack of sleep, bad domestic conditions, or all these combined. In Berlin schools they have begun to feed the hungry ones regularly with milk and bread. No compulsory education will educate the starving. The child that showed his first symptom of nervousness when a nursing, the child with pavor nocturnus, or that gets up tired in the morning, or suffers from motor hyperesthesia, pointing or amounting to chorea, unless relieved, instead of being punished by an uninformed or misanthropic or hysterical teacher, gets old or breaks down before the termination of the school term, or of school age. There should be separate classes for the feeble, for those who are mentally strong, or weak, or of medium capacity. All of such questions belong to the domain of the child's physician, the physician in general. The office of school physician is relatively new. Whatever we have done in establishing it in America has been preceded by countries to which we are not in the habit of looking for our models. Bulgaria and Hungary have no schools without physicians. On the other hand, Vienna has none for its 200,000 school children. It is reported that the aldermen refused to appoint one. One of them objected for the reason that the doctor might be tempted to examine the Vienna lassies too closely. His business would be, and is, to look out for the healthfulness of the school building, its lighting, warming, cleanliness, the cleanliness of the children and their health, and that of the teachers. A tubercular teacher is a greater danger to the children than those, who rarely expectorate, to each other. He would take cognizance of the first symptoms of infectious diseases, examine eyes, ears and teeth, and inquire into chronic constitutional diseases, such as rachitis and scrofula in the youngest pupils. He might undertake anthropometrical measure-

ments and benefit science while aiding his wards. He would be helped in all these endeavors by the teachers who must learn to pride themselves on the robust health of their pupils, as they now look for the accumulation of knowledge which may be exhibited in public examinations.

They would soon learn what Christopher demonstrated, that physical development, greater weight, and larger breathing capacity, correspond with increased mental power, joining to this the advice that a physical factor as well as the intellectual one, now entirely relied upon, should be introduced in the grading of pupils. (Charles F. Gardiner and H. W. Hoagland, *Growth and Development of Children in Colorado—Transactions of the American Climatological Association*, 1903.)

Our knowledge of the physiology and pathology of the *nervous system* of all ages would be defective without lessons derived from the fetus and infant. Amongst the newly-born we have often to deal with arrests of development, such as microcephalus, or with that form of fetal meningitis or of syphilitic alterations of blood-vessels which may terminate in chronic hydrocephalus. When the insufficient development of reflex action in the newly-born up to the fifth or sixth week has passed, the very slow development of inhibition during the first half year or more, together with the rapid increase of motor and sensitive irritability explains the frequency of eclampsia and other forms of convulsions. Many of them require, however, an additional disposition, which is afforded either by the normal rapid development of the brain, or the abnormal hyperemia of rachitis. The last twenty-five years have increased our knowledge considerably in many directions. Congenital or premature, complete or partial, ossification of the cranial sutures lead mechanically to idiocy, or paralysis, or epilepsy; it is a consolation, however, to know that the victims of surgical zeal are getting less in number since operators have consented to fear death on the operating table, and thoughtful surgeons have come to the conclusion to leave bad enough alone. In the very young the fragility of the blood vessels, the lack of coagulability of the blood, the large size of the carotid and vertebral arteries, the frequency of trauma during labor and after birth, the vulnerability of the ear and scalp, contribute to the frequency of nervous diseases, which before the fifth year amounts to a high percentage of all the cases of sickness.

Rapid exhaustion leads to intracranial emaciation and thrombosis, the socalled hydrocephaloid of gastroenteritis. The large size and number of the lymph vessels of the nasal and pharyngeal cavities facilitate the invasion into the nerve centres of infections which show themselves as tuberculous meningitis, cerebrospinal meningitis, and polioencephalitis, or more so, poliomyelitis, and as chorea of socalled rheumatic—mostly streptococcic—origin. Nose and throat specialists, as well as anatomists, have contributed to our knowledge on these points—another proof of the intimate dependency of all parts of medicine upon one another. Now all these conditions are not limited to early life, but their numerical preponderance at that time is so great that it is easy to understand that general nosology could not advance without the overwhelming number of well-marked cases amongst children. Amongst them are the very numerous cases of epilepsy. They escape statistical accuracy, for many an epileptic infant or child dies before his condition is observed, or diagnosed; a great many cases of petit mal, vertigo, dreamlike states and somnambulism, fainting, habit-chorea, truancy, imbecility, incompetency, or occasionally wild attacks of mania, or the perversity of incendiарism, or in older children religious delirium, even hysterical spells, are overlooked or perhaps noticed or suspected by nobody but the family physician; or, in the cases of the million poor, by nobody. They are cared for or neglected at home, and the seizure is taken to be an eclamptic attack due to bowels, worms, colds, and teeth, exactly like three hundred years ago.

Of equal importance in this disease to the pediatrician, the pedagogue, the psychiatrist, the judge, the statesman, no matter whether in office or a thoughtful citizen, is the influence of heredity. The old figures of Echeverria, which have been substantiated by a great many observers, tell the whole story. One hundred and thirty-six epileptics had 553 children. Of these, 309 remained alive; 78 (25 per cent) were epileptic; how many of the 231 that died had some form of epilepsy or would have exhibited it nobody can tell. He observed a dozen cases in one family. While in his opinion 29.72 per cent showed a direct inheritance from epileptic parents, Gowers has a percentage of 35, and Spratling, who has lived among epileptics nearly a dozen years, 66 per cent.

Epilepsy is acknowledged to be one of the causes of imbecility,

or genuine idiocy. In very many instances it should be considered as a coordinate result of congenital or acquired changes in the skull, the brain, and its meninges, and particularly the cortex. In a single idiot institution, that of Langenhagen, 15 per cent to 18 per cent of the 395—668 inmates were epileptic; in another, Dalldorf, 18.5 per cent to 24.3 per cent of 167—344; in a third, Idstein, 36 per cent of 101 (Binswanger, in Nothnagel, *Syst. Path. u Ther.*, Vol. XII., 1,310).

Its main causes are central. External irritations, worms, calculi, genital or nasal reflexes, may be occasional proximate causes. But cauterization of the nares, and still more, circumcision, and clitoridectomy prove more the helplessness or recklessness of the attendant than the possibility of a cure. The individual cases of recovery by the removal of clots, bones, or tumors, are great and comforting results, but if epilepsy and its relations are ever to disappear, it is not the knife of the surgeon, but the apparatus of human foresight and justice that will accomplish it. Most of the causes of epilepsy are preventable. To that class belong syphilis and alcoholism in various generations, rachitis, tuberculosis and scrofula, many cases of encephalo-meningitis, and most cases of otitis. A question is attributed to a royal layman, "If preventable, why are they not prevented?" If there is a proof of what Socrates and Kant said, namely, that statesmanship cannot thrive without the physician, it is contained in the necessities of epilepsy. Prevention, preventives, and hygienic, medicinal, and surgical aids have to be invoked, unfortunately with slim results so far.

The influence of hereditary syphilis on the diseases of the nervous system has been studied these twenty years, both by neurologists and pediatricians. Its results are either direct—that means characteristically syphilitic—or metasyphilitic—that means merely degenerative. Hoffmann cured a case of syphilitic epilepsy in a girl of nine years in 1712. Plenk describes convulsions and other nervous symptoms depending on hereditary syphilis, and Nils Rosen de Rosenstein describes the same in 1781. The literature of the later part of the eighteenth, and of the first half of the nineteenth century, is silent on that subject, though the cases of affections of the nervous system depending on hereditary syphilis are very frequent (13 per cent of all the cases, accord-

ing to Rumpf, *die Syph. Erk. d. Nervens*, 1889). Jullien (*Arch. Gén.*, 1901) reports 206 pregnancies in forty-three syphilitic matrimonies. Of the children, 162 remained alive. Half of them had convulsions or symptoms of meningitis.

According to Nonne (*die Syph. d. Nervens*, 1902) hereditary syphilis differs from the acquired form in this—that several parts of the nervous system are affected simultaneously; and that arteritis, meningitis, gummata, and simple sclerosis occur in combination. Simple cerebral meningitis and apoplexies are very rare. Encephalitis is more frequent. Probably spinal diseases are more frequent, according to Gilles de la Tourette, Gasne, Sachs, and others. Tabes dorsalis is not often found, but may rather depend on an atavistic syphilitic basis; for altogether the nerve syphilis of the second previous generation as a cause of disease in the young is not very rare. (E. Finger, *W. Klin. Woch.*, 13, 1900.)

What we call neuroses are not infrequent in infants and children. Neuralgias are not so common as in the adult, but would be more frequently found if sought for. Even adipositas dolorosa has been observed in childhood. Hysteria is by no means rare, and its mono-symptomatic character, so peculiar to early age, adds to its nosological importance. Its early appearance is of grave import. Its often hereditary origin makes it a serious problem; under-alimentation or ill-nutrition, rachitis and scrofula, frequently connected with and underlying it, may make it dangerous and a fit subject for the study of educators, psychologists, judges, and all those whose direct office it is to study social and socialistic problems. Hysteria is not quite unknown amongst males, though the large majority are females.

Some of the vaso-motor and trophic disturbances are less, others more frequent, in the young than in the adult. Amongst 129 cases of akroparesthesia there is only one of Frankl Hochwart in a girl of twelve years, and one of Cassirer in a girl of sixteen. Scleroderma is met with mostly in mature life, but the cases of Neumann at thirteen days, and those of Cruse, Herxheimer, and of Haushalter and Spillmann, who observed 2 cases in one family, all of them when the infants were only a few weeks old, prove that the same influences which are at work in advanced age, namely, hereditary disposition, neuropathic family

influence, low general nutrition, colds, trauma, and so on, may play their role in infant life. Nor are infant erythromelalgias numerous. Henoch saw one in a teething infant, Baginsky in a boy of ten, Heimann one in a girl of thirteen, Graves one in a girl of sixteen; that means 3 or 4 cases below thirteen or sixteen years of age, out of a number of 65 collected by Cassirer in his monograph. (*Die Vasomotorisch-trophischen Neurosen*, Berlin, 1901.) In half a century I have seen but one that occurred in early age, namely, in a boy of twelve, who got well with the loss of two toes. On the other hand, the symmetrical gangrene of Raynaud and the acute circumscribed edema of Milton and Quincke, 1882 (treated of by Collins in 1892), are by no means relatively rare in infancy and childhood. There are a few cases of the former that occurred in the newly-born. Two I have seen myself. There are those which have been observed at six months (Friedel), at nine months (De France), at fifteen months (Bjering), at eighteen months (Dick). In the year 1889 Morgan collected 93 cases, 13 of which occurred from the second to the fifth, 11 between the fifth and tenth, and 15 between the tenth and twentieth years. Amongst the 168 cases collected by Cassirer, 20 occurred below the fifth, 8 between the fifth and tenth, and 25 between the tenth and twentieth years of life. Like most nervous diseases, these cases had either congenital or acquired causes, amongst which a general neuropathic constitution, and the hereditary influence of alcohol, chlorosis, and anemia are considered prominent. Of acute circumscribed edema, 28 cases are found below nine years of age in Cassirer's collection of 160 cases, one of which at the age of one and a half months is reported by Crozer Griffith, one at three months by Dinckelacker. Again, hereditary influence is found powerful. Osler could trace the disease through five generations.

The connection of pediatrics with *psychiatry* is very intimate. Insane children are much more numerous than the statistics of lunatic asylums would appear to prove, for there are, for obvious reasons, but few insane children in general institutions. It is only those cases which become absolutely unmanageable at home that are entrusted to or forced upon an asylum. The example of the French, who more than fifty years ago had a division in the Bicêtre for mentally disturbed children, has seldom or not at all been imitated. Thus it happens that though not even a minor-

ity of the cases of idiocy become known, its statistics are more readily obtained than that of dementia of early life. Some of its physical causes or accompaniments have been mentioned—asphyxia with its consequences, ossification and asymmetrical shape of the cranium, accidents during infancy and childhood, neuroses that may be the beginning or proximate causes of graver trouble. Infectious diseases play an important part in the etiology of intellectual disorders. Althaus collected 400 such cases. They were mainly, influenza 113, rheumatism 96, typhoid fever 87, pneumonia 43, variola 41, cholera 19, scarlatina 16, erysipelas 11. In most of the cases there were predisposing elements, such as heredity and previous diseases, or over-exertion of long duration. The overworked brains of school children were complained of as adjuvant causes of lunacy by Peter Frank as early as 1804. We are as badly off, or worse, a hundred years later.

There is one ailment, however, that appears to hurt children less than it does adolescents or adults, that is masturbation. There are those cases, fortunately few, which depend on cerebral disease and original degeneracy, but in the large majority of instances masturbation, frequent though it be, has not in the very young the same perils that are attended by it later on when the differentiation of sex has been completed and is recognized. Babies under a year, and children under eight or ten will outlive their unfortunate habit, and do not appear to suffer much from its influence. Whatever is said to the contrary is the exaggeration of such as like to revel in horrors. The same exorbitant imagination is exhibited in other statements. What Lombroso and his followers have said of the faulty arrangement of the teeth, prognathic skulls, retracted nose, short and attached lobes of the auricle, as distinct symptoms of mental degeneracy, belongs to that class, and need not always be taken as the positive signs of insane criminality. There is so much poetical exaggeration and word painting in them that Lombroso and also Krafft-Ebing are the pets of the prurient lay public. In its midst there must be many who are anxious to believe with Lombroso that brown hair and eyes, brachycephalic heads, and medium size of the body characterize the insane criminal, if only for the purpose of scanning the hair and eyes and heads of their near friends and their mother-in-law's relatives.

It is certainly not true that, as Lombroso will have it, children are cruel, lazy, lying, thievish, just as little as according to him all savages are like carnivorous animals, and essentially criminal, while others are convinced that by nature they are amiable, like Uncas, and virtuous like Chingacook, and have been rendered savage only by the strenuousness of conquering immigrants. Nor is it true that the idiot brain is merely arrested at a stage similar to anthropoid, or even saurian development, for it is less arrest of development than the influence of embryonal or fetal disease, beside amniotic anomalies that cause the irregularities of the encephalon.

Amongst the worst causes of idiocy is cretinism, both the endemic and the sporadic. Every cretin is an idiot, not *vice versa*. The endemic form could be prevented by State interference which would empty the stricken valleys; the sporadic depends on the thyroidism, with or without a shortening of the base of the skull, and is partially curable. The idiotism of cretinism causes a fairly uniform set of symptoms; that which depends on other causes exhibits varieties, though not so many as imbecility, which, too, should not be taken to be the result of a single cause. Osseous and cartilaginous anomalies about the nose are pointed out by William Hill, chronic pharyngitis and nasal polypi by Heller, enlarged tonsils by Kafemann in one-third of the cases, some pharyngeal or nasal anomaly in four-fifths by Schmid-Monnard. Adenoids are frequently found as complications. Operations to meet all these anomalies have been performed with improvement of the mental condition in some, of the physical in many more, mainly when the anomalies were complications only. But after all, we should beware of the belief in miracles and in infallible cures. Mainly the tonsils have been puffed up to be the chief causes of many human troubles and their removal a panacea. According to a modern writer, it prevents tuberculosis, but the prophet is a little too bold, for he adds that, with the exception of himself, there are very few able to accomplish it. Defective or diseased brains are frequent in most conditions. The former class allows even imbeciles to excel in some ways. In that class may be found calculating experts, chess-players, or mechanical draughtsmen.

Imbecile persons may be taught sufficiently to prepare for the simple duties of life. There are, however, many transitions be-

tween the complete imbecile, the mild imbecile, and the merely slow and dull. That is why the condition is frequently not appreciated. In his school the imbecile child is slightly or considerably behind his class, and the laughing-stock of the rest. As he is intellectually slow, so he is morally perverse or is made to become so. He knows enough to lie and libel, to run away from school, and from truant to become a vagrant. It is true it will not do to declare the imbecile *per se* identical with the typical criminal, but as many of them are illegitimate, or of defective or alcoholic parents, or maltreated at home, or diseased and deformed, they get, by necessity, into conflict with order and the law. Thompson found 218 congenital imbeciles among 943 penitentiary inmates, Knecht 41 amongst 1,214. When the imbecile is once a prisoner his condition is not liable to be noticed on account of the stupefying monotony of his existence.

What is more to be pitied, the fate of the immature or imbecile half-grown child that naturally acts differently from the normal, or the low condition of the State which, instead of procuring separate schools for the half-witted, or asylums, has nothing to offer but contumely and prison walls, and increasing moral deterioration? This is the stone instead of the bread of the Gospel.

Modern society has commenced, however, to mend old injustices. Every civilized country admits irresponsibility before the law below a certain age, and gradually the mental condition of the criminal is taken into consideration and made the subject of study. But still, thousands of children and adolescents are declared criminal before being matured. The establishment of children's courts is one of the things, imperfect though they be, that make us see the promised land from afar. When crime will be considered an anomaly, either congenital or acquired in childhood, or a disease; when society will cease to insist upon committing a brutality to avenge a brutality; when self-protection will take the place of revenge, and asylums that of State prisons—then we shall be a human, because humane, society.

CONCLUSION

Pedology is the science of the young. The young are the future makers and owners of the world. Their physical, intel-

lectual and moral condition will decide whether the globe will be more Cossack or more republican, more criminal or more righteous. For their education and training and capabilities, the physician, mainly the pediatrician, as the representative of medical science and art, should become responsible. Medicine is concerned with the new individual before he is born, while he is being born, and after. Heredity and the health of the pregnant mother are the physician's concern. The regulation of labor laws, factory legislation, and the prohibition of marriages of epileptics, syphilitics, and criminals are some of his preventive measures to secure a promising progeny. To him belongs the watchful care of the production and distribution of foods. He has to guard the school period from sanitary and educational points of view, for heart and muscle and brain are of equal value. It is in infancy and childhood, before the dangerous period of puberty sets in, that the character is formed, altruism inculcated, or criminality fostered. If there be in the commonwealth any man or any class of men with great possibilities and responsibilities it is the physician. It is not enough, however, to work at the individual bedside and in a hospital. In the near or dim future, the pediatrician, the physician, is to sit in and control school boards, health departments, and legislatures. He is the legitimate adviser of the judge and the jury, and a seat for the physician in the councils of the republic is what the people have a right to demand. Before all that can be accomplished, however, let the individual physician not forget what he owes to the community now. Mainly to the young men amongst us I should say, do not forget your obligations as citizens. When we are told by Lombroso that there is no room in politics for an honest man, I tell you it is time for the physician to participate in politics, never to miss any of his public duties, and thereby make it what sometimes it is reputed not to be in modern life—honorable. A life spent in the service of mankind, be our sphere large or narrow, is well spent. And never stop working. Great results demand great exertions, possibly sacrifices. After all, whether everything in science and politics that now is our ideal will be accomplished, while we live or after we shall be gone, we shall still leave to our progeny new problems.

DEPARTMENT OF ABSTRACTS

BURNETT, C. H.; GREER, M. A.; BURROWS, B. A.; SISSON, J. H.; RELMAN, A. S.; WEINSTEIN, L. A., AND COLBURN, C. G.: THE EFFECTS OF CORTISONE ON THE COURSE OF ACUTE GLOMERULONEPHRITIS. REPORT OF A CASE. (New England Journal of Medicine, 243:1028, Dec. 28, 1950).

A case of acute glomerulonephritis in a boy of 5 years who was given 200 mg. of Cortisone daily for 12 days is described. Proteinuria and the number of formed elements in the urine did not decrease with Cortisone; indeed a transitory increase in these elements suggested that the hormone had a deleterious effect. Serum complement levels tended to be lower prior to Cortisone, and rose in association with the increase in hematuria and proteinuria. Inulin clearance was low and the tubular secretion of para-aminohippurate was normal or slightly low during initial studies; both rose on Cortisone and returned to control levels after the hormone had been withdrawn. Para-aminohippurate clearance and renal blood flow, low initially, showed progressive improvement throughout the course. These changes were possibly due to a favorable influence of this hormone on the pathologic process. It seems more probable that they reflected the effects of Cortisone on renal function per se, rather than on the inflammatory lesion, and changes consistent with the natural course of the disease.

AUTHORS' SUMMARY.

SINDONI, A. M.: AN UNUSUAL DIABETIC COMA IN A CHILD WITH RECOVERY, WITH SPECIAL REFERENCE TO INSULIN RESISTANCE AND HYPOPOTASSEMIA. (American Journal of Digestive Diseases, 17:406, Dec. 1950).

A 12-year-old white female was admitted to the hospital in a comatose state. Four days prior to the hospital admission the child had been taken to a physician because of marked vulva pruritus, increased thirst and urination and marked weight loss. At infrequent intervals during the past 3 to 4 months the patient has been suffering from cramp-like pains in the legs and abdomen. Several hours before onset of the coma the child has loss of appetite, drowsiness, marked weakness, nausea and vomiting. Exam-

nation revealed a severely emaciated child in an unconscious state, markedly dehydrated, with mouth, tongue and lips parched and with roughness and dryness of the skin. The breathing was deep with mouth partially open imparting a pronounced odor of acetone which was noticeable throughout the room. Blood sugar on admission was 430 mg. per 100 cc. This case of diabetic coma recovered following the administration of 7,200 units of insulin within 14 hours. Even though the patient had apparently recovered from the coma, acetone-like odor was still detected. Five hundred and fifty more units of insulin were then given within the following 10 hours. After the administration of 7,770 units of insulin, at the end of 24 hours, the patient's blood sugar level was 220 mg. per 100 cc. and the patient was symptom free.

MICHAEL A. BRESCIA, M.D.

RAFTERY, A.: SUBCLINICAL HISTOPLASMOSIS. GASTROINTESTINAL HISTOPLASMOSIS OF CHILDREN. (Journal American Medical Association, 145:216, Jan. 27, 1951).

Studies have established histoplasmosis as a common benign disease of childhood of world-wide distribution. 436 appendixes from the files were studied, comprising all the cases of chronic appendicitis, lymphoid hyperplasia of the appendix and normal appendixes submitted in a ten-year period. 54 of these were found to contain *H. capsulatum*. The clinical histories were reviewed and all but four of these children showed evidence of chronic illness. 36 ran a low grade fever during their hospital stay. 30 gave a history of recurrent abdominal pain and nausea for a period of from 3 years to 3 months prior to operation. 17 of the 23 with follow-up history showed recurrence of abdominal pain or fever. In 8 cases chest x-rays were reported as showing enlarged hilar nodes, hilar calcification or mild diffuse infiltration, all these having negative tuberculins. Two of the children are known to have developed lymphoblastoma in the year following appendectomy. Review of the patients so infected revealed that the great majority were suffering from an undiagnosed chronic disease. An unexplained high incidence of lymphoblastoma was found associated with the infection. The study is submitted as additional evidence in support of common benign histoplasmosis of children as a clinical entity. MICHAEL A. BRESCIA, M.D.

SMITH, R. P.; JONES, C. W. AND COCHRAN, W. E.: FERROUS SULFATE TOXICITY—REPORT OF A FATAL CASE. (*New England Journal of Medicine*, 243:641, Oct. 26, 1950).

A 17-month-old girl was admitted to the hospital acutely cyanotic and unresponsive after the ingestion of many ferrous sulfate tablets. At 6 P.M. she was discovered to have ingested a handful of ferrous sulfate (5 gr.) tablets. She was well until 10 P.M. when vomiting and diarrhea developed. At 1:00 A.M. the patient became cyanotic. At 2:00 A.M. the patient arrived at the hospital showing a gray cyanosis. She was completely limp and unresponsive, and her skin showed many blotchy ecchymoses. The respirations were slow and labored. In spite of all treatments the patient had a mild convulsion and died at 5:10 A.M. Post-mortem, performed 5 hours after death, revealed the buccal mucosa and tongue heavily coated with shaggy appearing, dirty brownish-gray material. The peritoneal cavity contained 200 cc. of clear, light yellow fluid. The mucosa of the small intestine appeared necrotic and large areas had sloughed away. MICHAEL A. BRESCHIA, M.D.

MARTIN, J. F. AND SAUNDERS, H. F.: GASTRIC ULCER IN CHILDHOOD—REPORT OF A CASE. (*Radiology*, 55:728, Nov. 1950).

A white boy of 6 years and 4 months was admitted to the hospital on August 4, 1948 because of intermittent, vague, generalized abdominal pain of one week duration. This was associated with nausea, anorexia and generalized malaise. The boy had vomited prior to admission and the vomitus was described as "black gravel." The stool examined prior to admission was tarry with a 4 plus benzidine test. The patient on examination appeared well and there were no signs of hemorrhage. Mild epigastric distress was elicited on palpation of abdomen. Roentgen studies on August 7 revealed an ulcer niche 1 cm. in diameter on the lesser curvature of the stomach, 2 cm. proximal to the pylorus. Moderate spasm and tenderness to palpation were present in the prepyloric region. During the first two hospital days the boy complained of mild generalized abdominal pain, vomited blood-streaked material once and had one tarry stool. The boy responded well to the ulcer regime ordered and roentgen study of August 27 showed the ulcer niche to measure 4 mm. and re-examination on September 20 failed to reveal any evidence of ulcer. MICHAEL A. BRESCHIA, M.D.

MALLEK, H. and SPOHN, P.: RETROLENTAL FIBROPLASIA. (Canadian Medical Association Journal, 63:586, Dec. 1950).

The incidence of retrobulbar fibroplasia is increasing rapidly and it is now the commonest cause of blindness in children. The clinical picture is variable but there is always a history of prematurity with a weight usually below three pounds. The infant appears to fix light poorly. It does not reach for objects presented to it, usually has a pronounced photophobia and often uses the backs of his hands to rub the eyes. The eyelids are often closed, the eyes smaller than normal and slightly sunken into the orbits. Examination reveals a greyish membrane filling the pupillary aperture, the anterior chamber is shallow, the cornea is small, the pupils respond poorly to light and the iris is lighter in color than normal. The etiology of this condition is unknown. Prematurity is the outstanding antecedent but no one considers that prematurity, per se, is the cause. The authors feel that transfusions of pooled stored blood to premature infants must be considered as a possible cause of fibroplasia. It is possible that in pooled blood there may be a factor as yet unknown that, on the one hand can cause retrobulbar fibroplasia in predisposed individuals, and in other individuals can cause homologous serum jaundice.

MICHAEL A. BRESCIA, M.D.

CARDULLO, H. M. and BERENS, D. L.: TRACHEOESOPHAGEAL FISTULA UNASSOCIATED WITH ATRESIA OR STENOSIS: DIFFICULTIES IN DIAGNOSIS AND SUGGESTIONS FOR GREATER ACCURACY. (New England Journal of Medicine, 243:853, Nov. 30, 1950).

Congenital tracheoesophageal fistula without esophageal atresia has rarely been diagnosed in the first few days of life. The authors report the case of a male infant of two days of age with a history of vomiting all feedings. On two occasions, immediately after taking nourishment, he had become cyanotic for several minutes. At autopsy the esophagus was normal except that from the top of the larynx there was a mid-anterior longitudinal slit, 3 mm. in length, through which there was an opening into the trachea. The trachea was normally formed except for the slit-like opening on its posterior surface that communicated with the esophagus. There was also a high I.V. septal defect. There are four types of tracheoesophageal fistulas. The most common is the condition in

which an upper segment of the esophagus ends in a blind pouch at about the level of the bifurcation of the trachea, and a lower segment from the stomach is connected to the trachea. Much less common is the condition in which both upper and lower segments of the esophagus end in blind pouches without any connection with the air passages. The third type is one in which the upper esophageal segment opens into the trachea and the lower segment is a blind pouch. The rarest condition, the one described in this case, is the communication of both upper and lower esophageal segments with the trachea or bronchus through a large dehiscence in the party wall. Hence, it is erroneous to assume that because a catheter can be passed into the stomach, there is no fistula.

MICHAEL A. BRESCIA, M.D.

LEE, C. M. and MACMILLAN, B. G.: THE FALLACY IN THE DIAGNOSIS OF MICROCOLON IN THE NEWBORN. (*Radiology*, 55:807, Dec. 1950).

With the increasing recognition of such congenital anomalies as atresia of the bowel and meconium ileus, the diagnosis of microcolon is being made with less frequency. No authentic case of primary microcolon has been found. On the basis of information furnished, all of the cases described as microcolon have occurred in instances in which the bowel has at some point been completely obstructed in utero. The colon distal to the obstruction has never contained meconium or served its purpose as an alimentary canal. In consequence it has remained collapsed and non-functional. The term microcolon is merely symptomatically descriptive, and the evidence indicates that no such primary anomaly exists. The demonstration, in a newborn infant, of a small undeveloped colon, by barium enema or at operation, should be regarded as a complete intestinal obstruction, and the cause of the obstruction should be sought and corrected.

MICHAEL A. BRESCIA, M.D.

DI GEORGE, A. and NELSON, W. E.: SOME OBSERVATIONS ON THE USE OF ADRENOCORTICOTROPIC HORMONE IN ATOPIC DERMATITIS IN INFANCY. (*Journal of Pediatrics*, 38:164, Feb. 1951).

It has been demonstrated that ACTH is effective in producing remissions in generalized atopic eczema (atopic erythroderma,

Hill). The disease becomes reactivated following cessation of the hormonal therapy. The evidence available at the moment does not indicate that this agent has any place in the therapy of infantile eczema except possibly as a temporary adjunct during periods of unusual stress. There was no evidence of untoward effects of ACTH on the infants treated for short periods of time in this study.

AUTHORS' SUMMARY.

KUGELMASS, I. N.: SUPPURATION OF THE SALIVARY GLANDS IN THE NEWBORN. (New York State Journal of Medicine, 51:613, March 1, 1951).

Inflammation of the salivary glands in the newborn is not as rare an occurrence as is generally believed. It usually develops towards the end of the first week in the delicate or debilitated newborn of low birth weight. Five cases of salivary gland involvement were observed within the last six years. The first manifestation was unexplained fever toward the end of the first week. Within 24 hours there was a swelling of the parotid or submaxillary gland on one or both sides. This became progressively larger, irregular, protuberant, and uniformly inflamed. Within 48 hours there was loss of appetite, difficulty in swallowing and diminution in weight. The blood showed a marked leukocytosis up to 40,000 per cu. mm. and neutrophils up to 80 per cent. Each of the five infants was born of a mother either susceptible to or afflicted with furunculosis during delivery. Sulfathiazole failed to prevent suppuration but penicillin and chloromycetin were most effective in arresting the infection.

MICHAEL A. BRESCIA, M.D.

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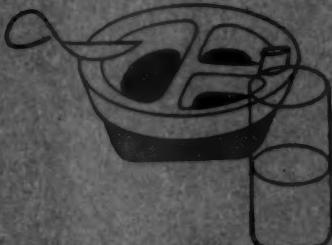
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